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ADVANCING THE PROFESSION OF ENTOMOLOGY [1]

JOHN W. WILSON
Central Florida Experiment Station

It is indeed a pleasure to meet with you, and I consider it a great honor to be asked to address the Subtropical Entomological Society. I want to congratulate you on your enthusiasm for and devotion to the profession of entomology, which has enabled you to successfully organize this thriving Entomological Society. I understand that you have made overtures to the Florida Entomological Society looking toward affiliation. The Florida Entomological Society will certainly be strengthened by your joining with us, and it is my earnest hope that the relationship will be mutually beneficial to the two organizations.

When the invitation to be your speaker for this evening was received, the first reaction was one of pleasure in honor thus bestowed. This reaction quickly turned to one of bafflement when the search for a subject began. Because of the somewhat brief interval between the receipt of the invitation and the time of the meeting, the duration of the first reaction was very short. Therefore, with some misgivings about its acceptability, I have chosen "Advancing the Profession of Entomology" as my title.

Some of us here tonight are students with all of the vigor and impatient thirst for knowledge of those just being initiated. Some are teachers with a broad knowledge and deep understanding of the whole field. Some are systematists, morphologists, ecologists, biologists or other specialists who have acquired a scholarly knowledge of their chosen field of activity. Others are economic entomologists. Economic entomology has recently been described as "a heterogenous mixture of entomology, business, economics, education, law, medicine, agriculture, engineering, physics, chemistry, biology, and statistics, all applied in various proportions and combinations to the control of insect pests".[2] No matter what the relative standing the various branches of entomology may occupy in our own eyes or in the eyes of others, the most important fact is that we are all entomologists. Each of the various branches of the science of entomology is intricately interwoven with all of the other branches so that there can be no placing of one branch above another or discredit to one branch without injury to the whole. Then let us ask, why should we who represent these various branches of the profession be concerned with the advancement of the profession as a whole?

The answer to that question is that as individuals we make our contribution to the reputation of the entire profession. Perhaps the statement just made sounds trite, but I think this idea should be given consideration occasionally by such groups as this. Only as individuals acting in concert in this and similar groups can anything be done about advancing the profession. One thing can be said with certainty. If our

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[1] An address delivered to the Subtropical Entomological Society, Miami, Florida, on June 13, 1956.

[2] *Frank L. Campbell.* 1956. Our society as seem from a distance. Jour. Econ. Ent. 49(2): 284.

profession is to advance, promising young people must be attracted into it. It follows that those of us who are members of the profession must act in such a manner that young people will be attracted to entomology.

The recent celebration of the 100th anniversary of economic entomology centered attention on the attainments of the past. The acceptance accorded that celebration by the general public is testimony to the glory of the past. That the profession of entomology has such a glorious past is due in large part to the unity of action of the students, teachers, scholars and applied branches all working together. Now that the period of celebration is past, it is time to consider the future. Then we ask, how can we as individuals advance the profession of entomology?

Many of you have seen the pamphlet, which was prepared by the Entomological Society of America, designed to direct the attention of high school students to entomology as a profession. The Florida Entomological Society, through the efforts of a special committee, is preparing an exhibit on the subject "Entomology in Action" for use at fairs and other such places where it will attract the attention of the general public and particularly young people about to enter college. Another committee of the Florida Entomological Society is assembling a set of color slides and is preparing an accompanying talk for presentation to high school seniors on the same subject, "Entomology in Action." Another method of attracting young entomologists is to encourage the establishment of apprenticeships or fellowships in entomology. Another excellent means of acquainting young people with entomology is through the Girl Scout and Boy Scout organizations. Almost all of us could volunteer as counselors for the entomology merit badge. Incidentally, the boy or girl who completes the requirements for this merit badge has had a good introductory course in entomology. These are some of the things that are being done or can be done to attract young people into the profession of entomology.

The present day trend toward greater specialization in narrower fields of most human activities is also evident in the profession of entomology. This specialization is responsible for the fact that the isolationist or the worker who can not or will not work closely and in harmony with others is rapidly disappearing. Dr. Herbert Ross, in his presidential address to the Entomological Society of America in 1954, discussed at length methods of avoiding the harmful effects of specialization. He pointed out the danger of stagnation if there is not a free exchange of ideas between entomology and other branches of science. Dr. Ross also suggested "that we increase the exchange of ideas between the various specialized fields of entomology, that we develop a more extensive system for bringing information from other branches of science into entomology and that many more entomologists integrate the findings of entomology into the pertinent basic and synthesizing branches of science."[3]

Because of this unavoidable trend toward specialization, there is a greater need for closer cooperation between the specialized branches of entomology and between the entomologists and workers in other sciences such as ecology, physiology, chemistry, biology, and genetics. That

[3] *Herbert H. Ross.* 1955. Free Trade. Bull. Ent. Soc. Amer. 1(1): 6-7 and 15.

this need for cooperation between scientists in differing fields has been recognized and is being met is illustrated by regional and state projects on insecticide residues. These projects involve economic entomologists, chemists, toxicologists, physiologists, and nutritionists. The joint publication by Lousiana and Arkansas of the bulletin entitled "Bollworm and Tobacco Budworm as Cotton Pests in Louisiana and Arkansas" is an excellent illustration of the advances made possible by the cooperation of two state experiment stations. An illustration of voluntary cooperation among widely scattered entomologists is provided by the regional project on the control of the corn earworm on sweet corn. In fact, this cooperative effort is not a formally outlined project. For the past five years entmologists representing the Entomological Research Branch, U.S.D.A., State Experiment Stations of Alabama, Georgia, Florida, Virginia, Pennsylvania, Texas, Illinois, Maryland, North Carolina, South Carolina, Kentucky, Ohio, and California have gotten together at the Cotton States Branch meetings and have agreed upon the experimental plan to be followed for a particular year. Mr. J. W. Ingram of the Entomological Research Branch is acting as coordinator, and Dr. W. G. Eden has compiled the data. Each year a different phase of the corn earworm problem has been selected for study. With such coordinated planning, the results from one year's study can be relied upon with complete confidence; whereas, if one worker alone conducted the same experiment, he would have to repeat the experiment several years to obtain data that could be relied upon with the same degree of confidence. With this kind of cooperation, a great deal more can be accomplished in a short period of time.

The administrative leaders of research organizations are keenly aware of the handicaps of this movement toward specialization and will encourage more of the cooperative types of projects. For example, 100 per cent of the projects reported upon in the 1924 Annual Report of the Florida Agricultural Experiment Station were conducted by individuals working alone. By contrast, in the 1954 report 39 per cent of the projects were conducted by individuals, 50 per cent of the projects were conducted by two or more cooperating workers in the same department and 11 per cent of the projects were conducted by workers in different departments. Of course, the staff of the Experiment Station has increased tremendously in this thirty year period. However, these figures emphasize the statement made earlier that the isolationist is rapidly disappearing. In a talk made about a year ago to the Sanford Kiwanis Club on the increasing complexity of the work of the Experiment Station, Dr. Beckenbach stated that the solution of present day problems requires the efforts of a team of scientific workers trained in different fields. He said also that in the selection of staff personnel the personality and ability of the applicant to work with others are given very careful consideration. All of this means that we as entomologists must place ourselves in the vanguard of this cooperative movement if the profession of entomology is to maintain its rightful position along with the other sciences.

Therefore, it is a waste of valuable time and somewhat childish to be concerned about the fact that recent presidents of the Entomological Society of America have been workers in the field of applied entomology.

Wigglesworth in a paper entitled "Contributions of Pure Science to Applied Biology" published in the Jubilee Number of the "Annals of Applied Biology" develops the thesis that it has more often been the applied branches of science which have accumulated new knowledge. The pure sciences then have been forced to develop new theories in explanation of existing knowledge. Each of you can suggest several instances in which this has happened. Instead of the illustrations Wigglesworth used, I have chosen two from our own experience here in Florida. The first is in the field of taxonomy. Only after the economic entomologist had pointed out the differences in habitat, biology and reaction to insecticides, two specific entites for the chinch bug were established. The second example is an unsolved problem in physiology. Those working with insects that attack citrus know that before parathion came into general use the phenomenon known as greasy spot was not a factor in citrus culture. They have found if oil is used in the spray schedule alone or in combination with parathion, greasy spot will not become serious. Wigglesworth goes on to state that in the solution of practical problems the applied scientist is in the forefront of the search for knowledge, that the processes of thought are the tools used by the applied scientist and that the function of pure science is to furnish applied science with adequate tools.

We should all exhibit the spirit of the British urchin who was accustomed to play in the streets near Buckingham Palace. The two boys being reared in the Palace had watched the snowball battles which often took place among the boys playing in the street. The two princes had attempted to put on similar battles inside the Palace fence. But they could never achieve the thrill and the reality of the battles outside the fence. So the two princes would watch the battles outside; and as they watched, they developed an intense longing to join in one of these snowball battles. One day as they watched, their guardian's attention was distracted for a moment. Immediately George said: "This is our chance, Philip", and they slipped through the gate. After only a few moments all signs of Royalty were thoroughly erased. Then the police arrived upon the scene and bundled the entire group into the paddy wagon. The boys were lined up before the judge in his wig and gown, on his high seat, representing the majesty and authority of British law. The judge said to the first boy: "Who are you, my lad." The boy drew himself up and replied: "My Lord, I am the Prince of Wales." The judge sat a little straighter, but he decided to go on with the questioning; so he turned to the second boy and asked: "Who are you, my lad." The second boy replied: "My Lord, I am the Duke of Gloucester." This startled the judge, but he proceeded with the questioning and turning to the third boy asked: "Who are you, my lad." The third boy shuffled his feet, brushed his trousers, lifted his head and replied with a limehouse accent: "My Lord, I stand with my buddies, I am the Archbishop of Canterbury."

THE SCOPE OF THE BEEKEEPING INDUSTRY IN FLORIDA

ROGER A. MORSE
State Plant Board of Florida, Gainesville

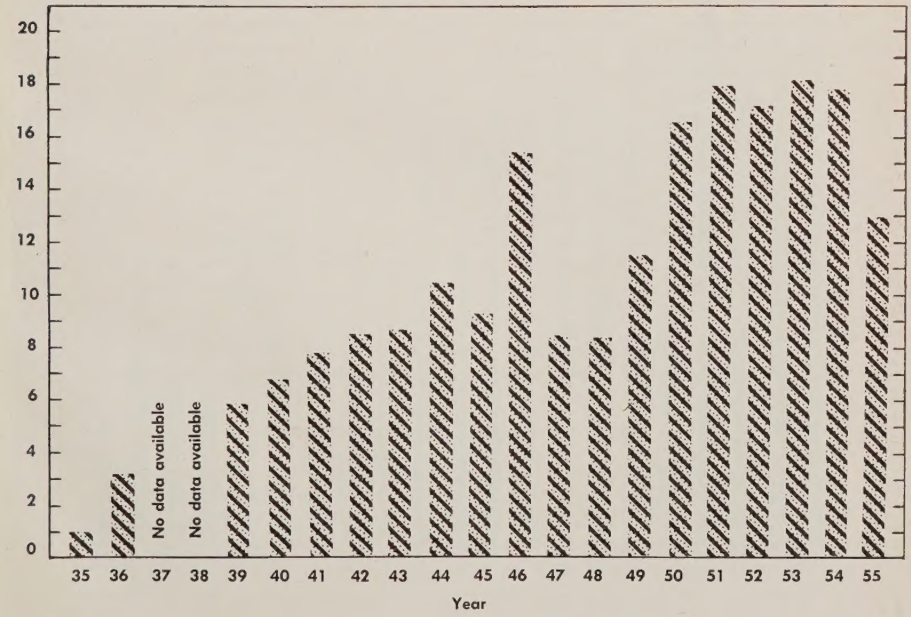
According to J. J. Wilder (1928) one of the first apiaries of any size in Florida was established in 1872 where the city of Daytona now stands. A company from New York City settled in the Daytona area and attracted considerable attention by coming to Florida in the fall and returning to New York in the spring with a cargo of oranges and honey.

HONEY PRODUCTION IN FLORIDA

Florida beekeepers produced their first million pounds of honey in the late 1920's, and during the 1930's consistently produced over a million pounds each year. Honey production in Florida has gradually increased and in 1954 Florida ranked third among the states. In 1955 Florida dropped to fifth place. Florida honey production for the past twenty years is given in graph 1 and table 1.

While honey production has increased appreciably, the number of colonies of honey bees in Florida has only a little more than doubled during the past twenty years. The increased honey production can be

GRAPH 1.—FLORIDA HONEY PRODUCTION 1935-55.



traced in part to the increased citrus plantings. At the same time a part of this gain is proof of the value of improved methods and equipment used in the industry today. A few decades ago many colonies were kept in skeps, hollow logs and boxes without movable combs. Today only a few hundred colonies are maintained under such conditions. Modern beekeepers are moving their colonies in and around the State, taking advantages of several honeyflows. An example of this mass movement of colonies is found in the over twenty thousand colonies which are moved to Florida each year, largely from other southern states, mostly for the orange honeyflow.

TABLE 1.—Florida Honey Production 1935-55.

Year	Pounds of Honey Produced
1935*	1,000,000
1936	3,125,000
1937	No data available
1938	No data available
1939**	5,760,000
1940	6,750,000
1941	7,738,000
1942	8,250,000
1943	8,586,000
1944	10,324,000
1945	9,100,000
1946	15,280,000
1947	8,190,000
1948	8,159,000
1949	11,340,000
1950	16,224,000
1951	17,876,000
1952	17,025,000
1953	18,088,000
1954	17,612,000
1955	13,090,000

* Data for 1935-36 from Fruit & Vegetable Market News Service, USDA.

** Data for 1939-55 from Crop Reporting Board & Bureau of Agricultural Economics, USDA.

APIARY INSPECTION IN FLORIDA

The State Plant Board of Florida began American foulbrood inspection in 1920. Until the fiscal year of 1954 the State Plant Board checked, on an average, about fifty per cent of the colonies in the State. By concentrating their efforts in the heavy honey-producing areas, State Plant Board inspectors were able to keep the incidence of the disease below levels of one per cent. As migratory operations have increased, disease

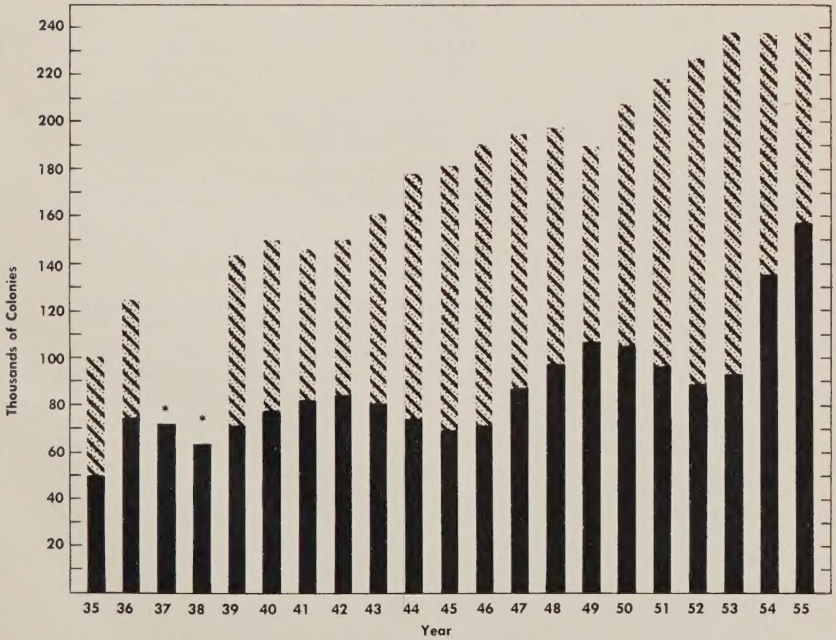
control has become more difficult, and during the past few years the incidence of American foulbrood has increased.

Approximately 57 per cent of the colonies in Florida were inspected during the fiscal year of 1954, while in 1955 approximately 66 per cent were inspected. The incidence of disease dropped from 1.597 per cent in 1954 to 0.903 per cent in 1955. Data concerning the number of colonies in the State and the number inspected are given in graph 2 and table 2.

Migratory operations will continue to increase, especially as more citrus trees come into bearing and more colonies are attracted into the State each year. Increased inspection will be necessary to keep the disease level below one per cent.

Beekeepers in the State recently requested the rescinding of a State Plant Board regulation which permitted the treatment of American foulbrood with sulfathiazole. Treatment of infected colonies had been used, in lieu of destruction by fire. Chemotherapy has proved to be impractical for the control of bee diseases in the field, and in the best interests of the industry the Plant Board rescinded its regulation.

GRAPH 2.—Number of Honeybee Colonies in Florida and Number of Colonies Inspected 1935-55. (Darkened Portions Indicate Number of Colonies Inspected.)



* No data on total number of colonies available

TABLE 2.—Number of Honeybee Colonies in Florida and Number of Colonies Inspected 1935-55.

Year	No. of Colonies	No. of Colonies Inspected
1935	100,000 *	49,379 †
1936	125,000	73,415
1937	No data available	72,795
1938	No data available	64,668
1939	144,000 **	70,655
1940	150,000	76,851
1941	146,000	81,950
1942	150,000	83,354
1943	162,000	80,823
1944	178,000	73,649
1945	182,000	69,262
1946	191,000	71,161
1947	195,000	87,674
1948	199,000	98,147
1949	189,000	105,678
1950	208,000	105,296
1951	218,000	95,405
1952	227,000	88,206
1953	238,000	92,267
1954	238,000	135,168
1955	238,000	157,388

* Data for 1935-36 from Fruit & Vegetable Market News Service, USDA.

** Data for 1939-55 from Crop Reporting Board & Bureau of Agricultural Economics, USDA.

† Data for Number of Colonies Inspected from Apiary Inspection Department of the State Plant Board of Florida. These figures refer to the fiscal year, whereas the USDA figures refer to the calendar year.

THE VALUE OF HONEY BEES AS POLLINATORS

The protection of the beekeeping industry by the State Plant Board is not based solely on the value of the honey and beeswax produced. Without honey bees for pollination, the production of some crops would be nearly impossible in Florida. During the past three years entomologists from the State Plant Board have been collecting and studying the wild bee populations in Florida. Some wild bees, such as the bumble bee, are helpful in the production of various crops, but 90-95 per cent of the pollination of the crops listed is accomplished by honey bees. In tables 3-5 are some of the crops where the honey bee plays an important role.

In addition to the crops listed in tables 3 and 4, several plants require insect pollination to produce seed. Some of the seed crops are of major importance in Florida, while others, especially the production of clover seed, are just now gaining importance here. Pollination of clover is not only important where the crop is produced for seed, but also in pastures where re-seeding is desired. In 1942 (with a revision in 1946) the Bee Culture Laboratory of the USDA prepared a mimeographed list of the

crops where the honey bee played a major role in pollination. Some of the crops listed and found in Florida are noted in table 5. No attempt has been made to assign a rank or relative value to these crops.

TABLE 3.—Florida Crops Wholly Dependent Upon Insect Pollination.*

Crop	Size of Marketable Crop	Value of 1954-55 Season
Watermelons	29,000,000 melons	$14,500,000
Cucumbers	3,089,000 bushels	9,239,000
Squash (all)	1,219,000 bushels	2,953,000
Cantaloupes	124,000 crates	527,000

TABLE 4.—Florida Crops Partially Dependent Upon Insect Pollination.*

Crop	Size of Marketable Crop	Value of 1954-55 Season
Strawberries	306,000 crates	$2,889,000
Avocado	472,000 bushels	1,345,000 (1954 season)
Lychee	No data available	———

* Data for Tables 3 and 4 from Florida Vegetable Crop, Annual Statistical Summary, 1955, Volume XI. Agricultural Marketing Service, USDA and Agricultural Experiment Station, University of Florida, Gainesville.

TABLE 5.—Florida Crops of Uncertain Value Which are Benefited by Insect Pollination.*

Alfalfa	Celery	Collards	Radish
Asparagus	Clovers	Cotton	Rutabaga
Beans	Alsike	Onion	Squash
Broccoli	Crimson	Parsnip	Sunflower
Brussel sprouts	Red	Pear	Turnip
Cabbage	White	Peach	Vetch
Carrots	White Sweet	Pepper	
Cauliflower	Ladino	Pumpkin	

* Data for Table 5 from The Dependence of Agriculture on the Beekeeping Industry—A Review, mimeographed series E584, USDA, July, 1946.

THE VALUE OF HONEY BEES IN CITRUS POLLINATION

Citrus blossoms produce a copious supply of nectar and attract a large number of insects, including honey bees and other pollinators. Orange honey is, and has been for a long time, the major honey crop in Florida. Colonies of honey bees may be found in abundance in the groves during the flowering period. Since there is always an abundance of honey bees, their value or effectiveness is often overlooked.

Citrus, to a large extent, is self-pollinated. There is some indication, however, that during years when there is a drought, or there has been a freeze, cross pollination may be of considerable value in setting fruit.

Recently Van Horn and Todd (1954), researchers in Arizona, worked on the pollination of Clementine (Algerian) tangerines. Four experiments were set up: first, a caged tree from which insects were excluded; second, a caged tree with a colony of honey bees inside; third, a caged tree with honey bees and bouquets of Hamlin orange, and later Meyer lemon blossoms; fourth, trees left to chance pollination. Trees in experiment three gave sixteen times more fruit than those in experiment number one; twice as much fruit as trees in experiment number two, and sixteen per cent more fruit than trees in experiment number four. Fruit produced under conditions in experiment number three was of better quality.

More data concerning other varieties of citrus are needed to determine the relative value of honey bees to the citrus grower. The role the honey bee plays is probably more important than most people realize. Unlike growers in the northern apple producing areas, citrus growers probably will not need to rent bees for pollination inasmuch as citrus honey provides the bulk of the beekeepers' income in Florida. Growers who assist bee-keepers in locating bees in groves undoubtedly are being well paid.

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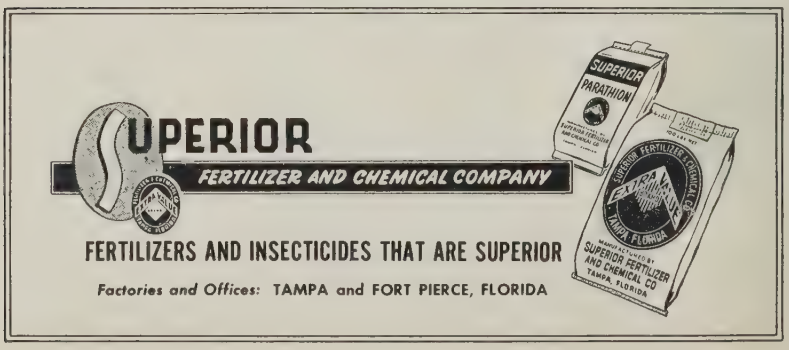


A NEW SPECIES OF SALT-MARSH SAND FLY FROM FLORIDA, THE BAHAMAS, PANAMA AND ECUADOR:

ITS DISTRIBUTION AND TAXONOMIC DIFFERENTIATION FROM CULICOIDES FURENS (POEY) (DIPTERA, HELEIDAE)

Willis W. Wirth[1] and Franklin S. Blanton[2]

The common salt-marsh sand fly of the eastern United States has been known since the work of Hoffman[3] as *Culicoides furens* (Poey) 1851 and the extensive literature on biology and control of salt-marsh sand flies has dealt with it under this name or that of its synonym, *dovei* Hall 1932. Only one species of this complex has previously been recognized on the Atlantic Coast. The purpose of this paper is to report the presence of a second and undescribed species of sand fly closely related to *furens*, with which it has been confused in the United States and in Panama, to discuss characters for the separation of the two species, and to outline their relative distribution and abundance as based on a study of material in the U. S. National Museum.

We are greatly indebted to John E. Porter of the U. S. Public Health Service Quarantine Station at Miami Beach, to R. L. Goulding and Robert F. Curran of the Cooperative Sandfly Laboratory at Dania, Florida, and to Mr. Elisabeth C. Beck of the Florida State Board of Health at Jacksonville for their interest in this problem and for sending Florida collections from which the new species was determined.

In revising the Panama species of *Culicoides* we have utilized certain quantitative characters of the females which, when compared, have been extremely helpful in separating some closely related species that at first seemed identical in color characters. These quantitative characters consist primarily of: 1) wing length, measured from the basal arculus to the wing tip; 2) the costal ratio, which is the value obtained by dividing the wing length by the costal length; 3) the relative lengths of the flagellar segments of the antenna; 4) the antennal ratio, which is the value obtained by dividing the combined lengths of the last five segments by combined lengths of the preceding eight; 5) the number and location of the antennal segments bearing small distal sensory areas each ringed by a tuft of short setulae; 6) the palpal ratio, which is the value obtained by dividing the length of the third segment by its greatest breadth; 7) the number of teeth on the mandible; 8) the number of spines in the comb at the apex of the hind tibia; and 9) the relative size and proportions of each of the spermathecae.

Using these characters as well as the fairly obvious differences of the male genitalia when the male sex could be associated, we found that

[1] Entomologist, Entomology Research Branch, Agricultural Research Service, U. S. Department of Agriculture, Washington, D. C.

[2] Lieutenant Colonel, MSC, Department of Entomology, Walter Reed Army Institute of Research, Washington, D. C.

[3] Hoffman, 1925, Amer. Jour. Hyg. 5:274-301.

there is in Panama a group of four closely related species: the widespread *furens* (Poey); *alahialinus* Barbosa, known only from Ecuador and Panama; *gorgasi* Wirth and Blanton, from Panama; and the species we are describing below as *barbosai* n. sp. from Florida, the Bahamas, Panama and Ecuador. All of these species have a mesonotal pattern of punctiform brown dots, female antennae with sensoria present only on segments III and VII or VIII to X; four tibial spines; two spermathecae; male genitalia with the ventral root of the basistyle foot-shaped, the paramere with the basal knob not prolonged anteriorly nor directed laterad, and the paramere with fringing distal spines. The mean values of the important quantitative characters of these species may be compared in the following table:

TABLE 1.—Quantitative Comparison of Structures in Four Species of Culicoides.

Species	Wing Length (mm.)	Coastal Ratio	Antennal Ratio	Sensoria on Segments	Mandible Teeth	Palpal Ratio
alahialinus	0.96	0.64	1.01	3,8-10	15	2.2
barbosai	0.88	0.58	0.93	3,7-10	16	2.2
furens	0.91	0.58	1.28	3,7-10	15	2.4
gorgasi	1.04	0.64	0.99	3,7(8)-10	17	2.4

Furens is the only species in this group with a distinct, small, round pale spot between the post-stigmatic pale spots and the distal pale spot in cell R_5 (this spot is easily seen in Poey's original figures), with pale halter, with the last five antennal segments greatly elongated and with a well developed ventral lobe on the male paramere.

Alahialinus has a very poorly marked wing and the mesonotum is slightly shining with very poorly marked punctures, the hind femur lacks the subapical pale ring and the male paramere is slender and twisted distally without ventral lobe.

Gorgasi has the anterior or median area of the mesonotum distinctly yellowish, antennal segments III-X decrease slightly in length distally, segment XI is equal to XII in length, XIII is equal to XIV but slightly exceeds XII in length, the male paramere is distinctively bowed ventrally in the portion bearing the low ventral lobe and bent and twisted distally.

Barbosai has the mesonotum uniformly grayish pruinose with brown punctures as in *furens*, the antennal segments III to X are of subequal lengths and segments XI and XIV gradually increase in length distally, and the male paramere is stout distally with a low ventral lobe and the apex not markedly twisted.

Because *barbosai* is not rare in Florida and Panama it is probable that some of the information on biology and control reported for *furens*[1]

[1] Fox, 1955, Jour. Agr. Univ. Puerto Rico 39:214-285.

apply indeterminably to either one or the other of these species or to mixtures of the two, with possible confusion of results and conclusions. Since the important differences between *barbosai* and *furens* are fairly easy to check, once their nature is understood, we offer the following descriptions and figures and summarize the known distribution of the two species as a guide to future workers.

Culicoides furens (Poey)

(Figure 1)

FEMALE.—Length of wing 0.91 (0.88-0.99, n = 16)[5] mm.

Head: Eyes narrowly separated, bare. Antenna with flagellar segments in proportion of 16:12:12:12:12:12:12:20:22:24:25:35, antennal ratio 1.28 (1.09-1.51, n = 7); distal sensory tufts present on segments III, VII-X. Palpal segments in proportion of 11:24:28:10:13, third segment slightly swollen, with a small, shallow sensory pit, palpal ratio 2.4 (2.1-2.9, n = 16). Mandible with 15 (12-17, n = 16) teeth.

Thorax: Mesonotum pollinose grayish, with a prominent pattern consisting of numerous, evenly scattered, punctiform brown dots at the seta bases. Scutellum brown in middle, grayish pruinose on sides; postscutellum and pleuron dark brown. Legs brown, knee spots blackish; femora pale at bases; femora with subapical, tibiae with sub-basal and hind tibia with apical, narrow pale rings; hind tibial comb with 4 (n = 15) spines, the one next to the spur longest.

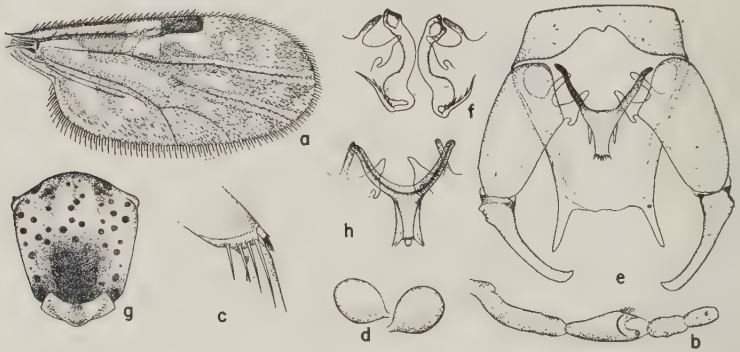
Wing: Pattern as figured; second radial cell blackish; pale spot over r-m crossvein quite broad; cell R_5 with three small round post-stigmatic spots in a triangle, the two next to the second radial cell more or less fused, a large, oblique, double spot broadly meeting wing margin in distal part of cell; vein M_1 pale margined from apex nearly to its base, veins M_2 and M_{3+4} pale margined on distal halves; cell M_1 with three pale spots, the distal one located at the wing margin; cell M_2 with two pale spots in distal part, the distal one broadly meeting wing margin; cell M_4 with a large pale spot; two small round pale spots in distal part of anal cell; pale area at base of anal cell narrowly connected to the large pale area over wing base; pale spot present in cell M_2 behind medical fork. Macrotrichia fairly numerous on distal half of wing and in anal cell; costal ratio 0.58 (0.56-0.61, n = 16). Halter pale.

Abdomen: Dark brown, cerci yellowish. Spermathecae two, pyriform, subequal, measuring 0.057 by 0.037 mm., the bases of the ducts sclerotized a considerable distance.

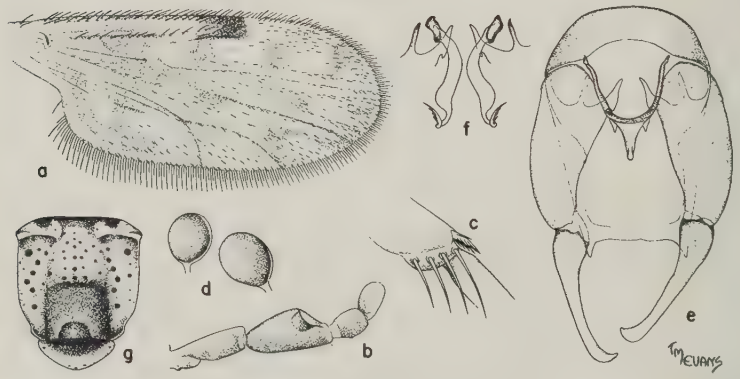
MALE GENITALIA.—Ninth sternum with broad, deep caudomedian excavation; ninth tergum markedly tapering with very long, slender, pointed apicolateral processes. Basistyle with ventral root foot-shaped, dorsal root slender; dististyle slender, slightly curved, with bent, pointed tip. Aedeagus with very broad, rounded, basal arch extending to about half of total length, the basal arms evenly curved; distal portion with two variations, in one the slender, median, distally striate tip is flanked by

[5] Our measurements are presented as follows: mean (minimum-maximum, n = number of measurements).

a prominent pair of lateral points of about the same length as the median tip; in the other the lateral points are apparently lacking and the striated median tip is broader. Parameres each with basal knob large, stem moderately stout and curved, bearing an extremely large ventral lobe; distal portion tapering to a fine point and bearing about five strong lateral barbs.



1. FURENS



2. BARBOSAI

Figure 1. *Culicoides furens*

Figure 2. *Culicoides barbosai*

a, female wing; b, female palpus; c, hind tibial comb; d, female spermathecae; e, male genitalia, parameres removed; f, male parameres; g, dorsal thoracic pattern; h, male aedeagus.

Distribution.—We have examined specimens from all of the following localities except the one in brackets: Outside the United States, — Antigua, Bahamas, Barbados, Brazil, British Honduras, Colombia, Cuba, Dominican Republic, Ecuador, French Guiana, Guadaloupe, Guatemala,

Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Pureto Rico, St. Croix, St. John, [St. Vincent], Trinidad, Venezuela. United States, — Florida, Georgia, Louisiana, Maryland, Massachusetts, Mississippi, New Jersey, North Carolina, South Carolina, Texas.

Discussion.—Males of *furens* from Florida, Georgia, Bahamas and Louisiana, and about half of our males from Panama, have the prominent lateral sclerotized points at the tip of the aedeagus lacking, although in some a pair of sclerotized points in the proximal part of the membranous covering near the juncture with the basal arch are more or less developed. Males from Trinidad, and from the Panama localities—Aguadulce, Garachiné, Puerto Mensabé and Tocumen and part of a series from Río Hato—have these lateral points well developed. No correlated differences have been found in structural or color characters of the females from these localities, so this character is not an especially strong one. At most, if an extensive study could be made of males from all possible circum-Caribbean points, this character might be of use in separating the southerly form from the northern *furens* as a subspecies under the name of *maculithorax* (Williston), but we do not have material available for such a study.

Culicoides barbosai n. sp.

(Figure 2)

Female.—Length of wing 0.88 (0.83-0.92, n = 5) mm.

Head: Eyes nearly contiguous, bare. Antenna with flagellar segments in proportion of 18:13:13:13:13:13:13:13:15:18:20:20:28, antennal ratio 0.93 (0.92-0.95, n = 3); distal sensory tufts present on segments III, VII-X, rarely absent on VII. Palpal segments in proportion of 9:17:21:8:8, third segment moderately swollen, with a small, deep sensory pit, palpal ratio 2.2 (1.8-2.3, n = 3). Mandible with 16 (15-16, n = 3) teeth.

Thorax: Mesonotum pruinose gray with pattern of dark brown punctiform dots at bases of mesonotal hairs, these dots irregularly fused in some areas, principally in two sublateral longitudinal bands. Scutellum narrowly dark in middle, yellowish on sides. Postscutellum and pleuron dark brown. Legs dark brown; knee spots blackish, all femora with subapical, all tibiae with sub-basal and hind tibia with apical, narrow pale rings; hind tibial comb with 4 (n = 5) spines, the one nearest the spur longest.

Wing: Pattern as figured; large yellowish anterior spots present at wing base and over r-m crossvein; two longitudinally elongate post-stigmatic pale spots present in cell R_5, narrowly fused to form an hour-glass shaped spot; distal pale spot in cell R_5 large, rounded and broadly meeting anterior wing margin; two pale spots in cell M_1, the proximal one streak-like and lying adjacent to vein M_2, the distal one usually connected by a narrow pale line to wing margin; veins M_1 and M_2 faintly pale-margined on distal halves; a pale line running through cell M_2 to the pale spot at apex of cell; large pale spot present in cell M_1; two pale spots, more or less coalesced, in distal part of anal cell. Macrotrichia numerous on distal half of wing and a few in anal cell; costal ratio 0.58 (0.57-0.59, n = 5). Halter dark.

Abdomen: Dark brown, cerci pale. Spermathecae two, subequal, ovoid, measuring 0.045 by 0.030 mm., the bases of the ducts sclerotized a short distance.

MALE GENITALIA.—Ninth sternum with broad caudomedian excavation; ninth tergum long, the apicolateral processes only moderately long and pointed. Basistyle with slender, foot-shaped ventral root and slender dorsal root; dististyle long and very slender, with bent apex. Aedeagus with basal arch extending to about 0.6 of total length of aedeagus, basal arms moderately slender and slightly curved, distal portion tapered to slender, rounded point with an indistinct lateral pair of pointed hyaline processes near juncture with the arch. Parameres each with strongly sclerotized basal knob, stem slender and curved near base, distal portion gradually more swollen until there is an appearance of a distinct low ventral lobed area beyond which the distal portion is quite slender, tapering to fine point with two or three minute lateral barbs.

DISTRIBUTION.—Panama; Florida, Bahamas, Ecuador.

Holotype: Female, Mojinga Swamp, Canal Zone, January, 1953, F. S. Blanton, light trap (type No. 63157, U.S.N.M.). Allotype male, same data, except date 13 January, 1953. Paratypes, 15 males, 50 females: Canal Zones — 2 females, Fort Randolph, 14 July, 1954, G. Field (horse trap); 13 females, Fort Sherman, April, September, October, 1953; 2 males, 8 females, Galeta Point, 28 August, 1952; 1 female, Loma Boracho, 22 April, 1953; 13 males, 15 females, Mojinga Swamp, January, 1953; 11 females, Balboa, 28 April, 1942, P. A. Woke (including 3 paratypes of *wokei* Barbosa not Fox). Other material examined, —BAHAMAS, B. W. I.: 30 females, Nassau (Bishop No. 14902); 1 male, 3 females, South Bimini Island, June, July, 1951, Cazier, C. & P. Vaurie, Berlese trap. FLORIDA: Collier Co., 6 females, Marco, 15 November, 1925, W. E. Dove; 8 females, Caxambus, 14 November, 1925, W. E. Dove; 1 female, Gordon Pass, March, 1950, light trap. Dade Co., 1 female, Biscayne Key, 17 April, 1949, light trap; 1 male, 31 females, Miami Beach, April, 1952, J. E. Porter, sticky trap; 1 male, 4 females, North Miami Beach, 18 April, 1951, J. E. Porter, light trap. Lee Co., Sanibel Island, 23 March, 1954, light trap. Monroe Co., 3 females, 3 January, 1951, F. W. Mead, sta. 325; 1 female, Rock Harbor, 3 December, 1948, Brown, light trap. Palm Beach Co., 1 female, October, 1951. R. Curran, light trap. ECUADOR: Esmeraldas Prov., 8 females, Limones, 1953, L. A. Leon.

DISCUSSION.—With our limited material from the U. S. National Museum collection we can only state that *barbosai* is common in southern Florida and the Bahamas, where at times it may outnumber *furens* in biting collections. From the long Panama and Bimini series of the two species it seems probable, however, that *furens* is generally by far the more abundant species, even in the optimum part of the range of *barbosai*. It will be necessary to make additional surveys throughout the range of *furens*, especially on the Atlantic Coast of the United States, to determine how far the range of *barbosai* extends as a rare or occasional species.

SOME MITES FROM LYCHEE

DESCRIPTIONS OF TWO NEW GENERA AND FIVE NEW SPECIES OF TARSONEMIDAE

Donald De Leon
Coral Gables, Florida

The increasing commercial importance of lychee (*Litchi chinensis* Sonn.) has increased the interest in the organisms found on it and in the role they play in its economy. Dekle[1] has discussed the insect and tetranychid mites found on lychee. This paper deals with some mites not discussed in that paper; a second paper also dealing with mites on lychee will follow.

Measurements used in the descriptions are in microns and are averages; where measurements differed more than ten per cent from the average the range is given.

Daidalotarsonemus, new genus

Tarsonemidae with dorsum of female marked off into plates and with some of the dorsal setae enlarged apically; male with dorsal body setae rather long, some of them coarse and spiculate, and with tibia IV much longer than wide; palpi of both sexes long.

The long tibia IV of the male may indicate that this group of mites is related to *Hemitarsonemus* Ewing, but the long, spiculate setae of the male and the dorsal plates and enlarged setae of the female distinguish this group from *Hemitarsonemus* as well as from the other genera.

Type of genus: *Daidalotarsonemus tessellatus*, n. sp.

Daidalotarsonemus tessellatus, n. sp.

(Figure 1)

Female:—Body broadly oval, black, hysterosoma centrally somewhat flattened. Propodosoma produced anteriorly forming a hood over capitulum and laterally over coxae; lateral margin of hood with a broad notch slightly anterior of middle; dorsum marked off into irregularly shaped plates. Hysterosoma with anterior part of dorsum marked off into more or less rectangularly to hexagonally shaped plates arranged in four ranks (first rank sometimes partly covered by base of propodosoma); caudal part of hysterosoma marked off into less uniformly shaped plates. Capitulum, not including palpi, about 25 long and 25 wide; palpi 15 long each with a seta on outer margin near distal end of terminal segment and two sensillae on apex. Expanded apex of pseudostigmatic organ oval. Length of body 190, width 103.

Dorsal chaetotaxy: First propodosomal coarse, scabrous in appearance, 25 long, situated near anterior margin of hood, distance to opposite member 24; second propodosomal coarser than first, scabrous in appearance, 28 long, situated about 11 behind marginal notch of hood. First hysterosomal at side of body near main body suture, 16 long; second coarser than the first, scabrous in appearance, 15 long; third elliptic with a pro-

[1] Dekle, G. W. 1954. Some lychee insects of Florida. Fla. State Hort. Soc. 67:226-228.

nounced "mid-rib" extending nearly its full length, edges serrulate, 36 long, 6 wide, distance to opposite member 41; fourth sub-triangular to broadly oval in outline, practically transparent, 18 long, 10 wide, distance to opposite member 36; fifth similar to third, but usually somewhat smaller, distance to opposite member 10; sixth narrowly elliptic, 12 long.

Ventral chaetotaxy: First propodosomal about 4 long, 3 behind apodeme I, distance to opposite member 11; second 7 long, 1 behind apodeme II, distance to opposite member 24. First hysterosomal 12 long, situated 2 anteromedially of anterior end of apodeme III; second 7 long, situated usually against outer margin at posterior end of apodeme IV, but sometimes about half way between posterior end of apodeme IV and coxa III; a caudal seta 13 long.

Apodemes: Anterior median apodeme mostly indistinct, extending from apodemes I to transverse apodemes, widening caudal of apodemes II; apodeme II may or may not unite with median apodeme; transverse apodemes meeting, together nearly as wide as body, curved forward medially and more strongly laterally; apodeme III extending anteromedially; apodeme IV mostly indistinct, it may or may not unite with posterior median apodeme which extends from a point about even with posterior ends of apodemes IV to a point about even with the first ventral hysterosomals.

Legs: Leg I from base of femur to end of claw about 52 long; tibiotarsus 18 long, 6 wide, with a set of three small sense organs (one clavate, one rod-like, the third tapering and about twice as long as the other two) situated dorsad about a quarter the length of segment from its base, and five setae ringing the segment in this area, a clavate, annulated sense organ 6 long, 1.4 wide and three setae at about a third the length of segment from its distal end, three stout setae and two ventral spurs at distal end, caruncle small, claw robust; genu I with four setae, the proximal one coarse and longer than the segment; femur I with three setae, one coarse, scabrous in appearance and about as long as genu I. Tarsus II with three normal setae and an annulated, clavate sense organ 5 long, 2 wide; tibia II with four setae all longer than the segment; genu II with three setae, one a coarse, scabrous, proximal seta slightly longer than the segment; leg IV about 32 long, preapical seta of segment IV about 24 long, apical seta about 35 long.

MALE:—Body oval, widest at about coxae III, depressed; propodosoma and legs brownish, anterior part of hysterosoma shiny black, caudal part whitish to brownish. Capitulum 22 long (not including palpi), 25 wide; palpi 13 long, 4 wide, segmentation indistinct, two short setae on outer margin near distal end and apparently three short sensillae on end. Genital papilla 27 long, 26 wide, apical third narrowed, expanded at apex, base emarginate. Body 147 long, width 83.

Dorsal chaetotaxy: Propodosomals 25, 15, 41 and 21 long respectively, scabrous in appearance, second situated slightly nearer third than first (4 from third) and barely lateral of a line drawn between first and third; fourth caudolateral of third, about 4 distant. First hysterosomal at side of body less than its length from hysterosomal suture, smooth, thin, 27 long; the remaining three pairs of hysterosomals coarse, scarcely tapering, spiculate, all about 30 long, the second over coxa III, the third

slightly anterior to secondary body suture and about 14 caudolateral of second, the fourth over lateral basal part of genital papilla.

Ventral chaetotaxy and apodemes: First propodosomal 4 long, about 4 behind apodeme I, distance to opposite member 9; second 9 long, 4 behind apodeme II, distance to opposite member 16; medial end of apodeme II curved slightly forward uniting with anterior median apodeme which is distinct between apodemes I and II and indistinct or absent between transverse apodemes and its union with apodemes II; transverse apodemes faint, united at mid-line; area for a short distance anterior to transverse apodemes densely covered with minute black spots; an inverted T-shaped "apodeme" near dorsal surface at mid-line above transverse apodemes, 11 wide, the lateral ends curved slightly forward, the stem about half the length of an arm. First and second hysterosomals about 15 long, apodeme III faint, apodeme IV distinct to where it turns caudomedially to join anterior end of posterior median apodeme, posterior median apodeme distinct.

Legs: Leg I, measured from base of femur to end of claw, 55 long; length of tarsus I 13, width 4, with a clavate, annulated sense organ about 3.7 long, 1.4 wide situated about its length from base of segment, a short dorsal seta and two ventral setae at about mid-section, a stout preapical seta, and three stout setae at distal margin; caruncle and claw moderate in size. Tibia I with five setae and a set of three sense organs, the middle one enlarged distally and about half the length of its seta-like second member, the third clavate, about a third longer and somewhat wider than the middle member; genu I with four setae, femur I with three setae. Tarsus II with a proximal, clavate, annulated sense organ about 4.2 long and 2 wide and three setae; tibia II with four setae; genu II with three setae; femur II with three setae, the two dorsal ones close together. Coxa III with numerous minute black dots. Coxa IV sub-rectangular, about one and a half times as wide as long, dorsal surface with numerous minute black dots; femur IV 37 long, about 19 wide near base, tapering rapidly beyond proximal seta, dorsal seta 15 long, proximal seta 5 long, distal seta 23 long; tibia IV 20 long, 5.6 to 7 wide, dorsal sense organ rod-like, 8 long, ventral seta 73 long; tarsus IV about as long as wide with one ventral and two dorsal setae; claw 13 long, stout.

Holotype: Female; U. S. Plant Introduction Garden, four miles south of South Miami, Florida, 6 April, 1955, (D. De Leon) from *Litchi chinensis*. *Allotype*: same data as for holotype. *Paratypes*: one female, 1 December, 1955; four females and two males, 7 June, 1956, other data same as for holotype. Found at bases and between elements of dormant leaf buds; it appears to be a plant feeder.

Daidalotarsonemus fossae, n. sp.

(Figure 2)

D. fossae may be distinguished from *D. tessellatus* by the shape of hysterosomals three, four, and five which are obovate and without longitudinal ridges; in *D. tessellatus* seta three and five are elliptic and with a longitudinal ridge, seta four is broadly oval to sub-triangular in shape.

FEMALE:—Body oval, mostly black. Capitulum, including palpi, 38 long, 24 wide; palpi 15 long, 3 wide. Propodosoma expanded to form a hood over basal half of capitulum and laterally over coxae, a notch on lateral margin about even with base of capitulum; spiracle at base of notch; expanded apex of pseudostigmatic organ oval; dorsal plates usually indistinct. Hysterosoma four-segmented dorsad; dorsal plates of first segment with longitudinal grooves demarking them faint, but usually more distinct than transverse grooves, forming eight longitudinal plates between second hysterosomals, the plates extending from about hysterosomal suture to somewhat caudal of second hysterosomals, the rank of plates behind these indistinct, dorsal plates of segment two and three somewhat indistinct, but caudal edges between fourth and fifth hysterosomals forming a distinct scalloped line. Length of body 175 to 199, width 70 to 117.

Dorsal chaetotaxy: First propodosomal coarse, with fine spicules, tapering, 22 long, situated on a raised base near lateral edge of hood and just anterior to spiracle, distance to opposite member 24; second obovate, smooth, 26 long, 2 wide, situated 19 caudal and slightly lateral of first. First hysterosomal obovate, with fine spicules, 19 long situated slightly behind hysterosomal suture, distance to opposite member 57; the second to fifth hysterosomals similar to first; second 21 long, 27 caudal of first, distance to opposite member 47; third 20 to 25 long, on second segment about half its length from caudal edge, distance to opposite member 35; fourth and fifth forming nearly a transverse row on third segment, fourth 10 to 15 long, distance to opposite member 37, fifth 21 long, distance to opposite member 10; sixth on terminal segment, barbulate, narrowly elliptic, about 12 long.

Ventral chaetotaxy and apodemes: Apodeme I short, rather thick, anterolateral end a sharp spur, medial end united with opposite member to form a bowl shaped curve; first propodosomal 4 long, 2 behind apodeme I, distance to opposite member 10; apodeme II short, indistinct except for a knot at medial end and one at about mid-length; second propodosomal 7 long, against or nearly against rear edge of mid-length knot, distance to opposite member 26; anterior median apodeme extending to transverse apodemes, mostly indistinct, scarcely visible near its juncture with apodomes I, widening somewhat caudal of medial ends of apodemes II, distinct for two short distances beginning at about 5 and 14 from apodemes I. Transverse apodemes thick, united at mid-line, together about 70 wide forming a shallow curve nearly the width of the body. First hysterosomal 8 long, situated just medial of anterior end of apodeme III, distance to opposite member 14; second 8 long, on caudal end of apodeme IV; apodeme IV indistinct, short, united with posterior median apodeme at about midpoint of latter apodeme; what appears to be a secondary apodeme extending from base of coxa IV to and then along caudal side of apodeme IV almost to juncture of apodeme IV with posterior median apodeme; posterior median apodeme about 29 long, fairly distinct, less so at its union with apodeme IV and at anterior end which ends as a V-shaped fork at a point about even with first hysterosomals.

Legs: Slender, leg I about 51 long. Tibiotarsus 20 long, about 5.6 wide at base; proximal half with a dorsal seta longer than segment, a

set of two sense organs (one clavate, the other seta-like) lateral to it, and two ventral and two lateral setae distal to them; distal half with a clavate, annulated sense organ about 4.2 long and 1.4 wide, a seta distolateral of it, a ventral seta near end of segment, and four stout setae (one preapical, the others at distal margin); genu I with a coarse, proximal seta and three distal setae. Tarsus II with a proximal, annulated, clavate sense organ about 3.9 long by 1.5 wide and three distal setae; tibia II with one dorsal and three distoventral setae; genu II with a coarse, proximal seta and two distal setae. Segment III of leg IV, 18 long with a basal and a preapical seta; segment IV, 10 long, preapical seta 16 long, apical seta about 25 long.

MALE:—Not known.

Type: Female; U. S. Plant Introduction Garden, four miles south of South Miami, Florida, 26 June, 1956, (D. De Leon) from *Litchi chinensis*. *Paratypes*: six females, other data same as for type.

Ceratotarsonemus, new genus

Tarsonemidae with dorsal hysterosomal setae barbulate and long, some nearly as long as or longer than width of body at hysterosomal suture; palpi moderately long. The female with secretions of wax or wax-like substance on dorsum; the male with femur IV elongated, tibia IV about as wide as long.

Type of genus: *Ceratotarsonemus scitus*, n. sp.

Ceratotarsonemus scitus, n. sp.

(Figures 3 & 4)

FEMALE:—Body somewhat compressed, dorsum strongly convex lengthwise. In life, propodosoma yellowish brown and bearing dorsad a central mound of whitish wax or wax-like substance and one or two pairs of smaller mounds lateral to it; hysterosoma except for a dorsocentral white area on opisthosoma, shiny black, the dorsum at anterior mid-area bearing a large spool-like body of whitish wax or wax-like substance, a small pair of tufts of similar material lateral to it, and behind it a small mound of similar substance broad at the base and tapering caudally to a blunt end. Propodosoma scarcely produced anteriorly. Capitulum 22 long not including palpi, 23 wide; palpus apparently 2-segmented, 14 long, 4 wide, basal segment with a seta nearly as long as following segment which bears two setae, each about 4 long on outer margin near distal end, two rod-shaped sensillae each about 3 long and 1 wide on end of segment. Expanded apex of pseudostigmatic organ oval. Hysterosoma with a pair of crescent-shaped markings between first pair of setae and a reticulated area between second pair. Length of body 140 to 180, width 85 to 105.

Dorsal chaetotaxy: All dorsal body setae barbulate and coarse; first propodosomal 57 to 75 long, second 84 to 115 long; hysterosomals 47 to 65, 70 to 108, 57 to 77, 120 to 140, 44 to 56, and 30 to 45 long respectively. Caudal seta 20 long, scabrous in appearance.

Ventral chaetotaxy and apodemes: First propodosomal 4 long, 3 behind apodeme I, distance to opposite member 7; second 7 long, on rear

margin of apodeme II, distance to opposite member 23; apodeme II slightly incurved at medial end, not reaching anterior median apodeme by 3; anterior median apodeme distinct, except sometimes for a short distance at each end, extending from apodemes I to transverse apodemes which are united at mid-line together forming a distinct and fairly straight line for about half the width of body, their lateral halves then curving rapidly anterolaterally. First hysterosomal 8 long, distance to opposite member 10,

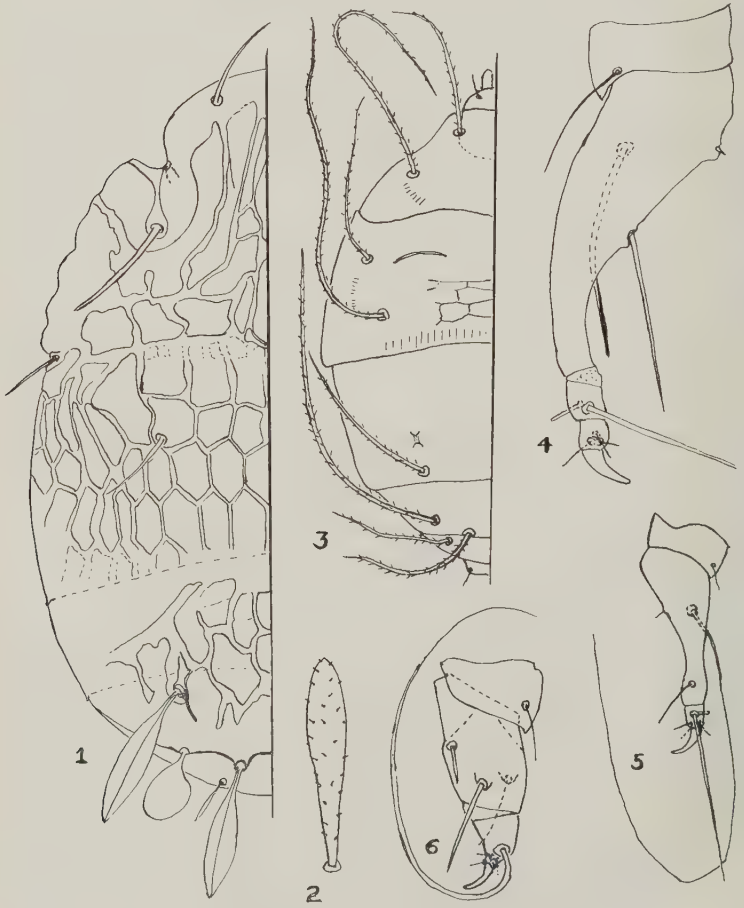


Fig. 1. Dorsal half of *Daidalotarsonemus tessellatus*, n. sp.
Fig. 2. Dorsal hysterosomal seta of *D. fossae*, n. sp.
Fig. 3. Dorsal half of *Ceratotarsonemus scitus*, n. sp.
Fig. 4. Ventral view of leg IV of male *C. scitus*, n. sp.
Fig. 5. Ventral view of leg IV of male *Rhynchotarsonemus filifer*, n. sp.
Fig. 6. Ventral view of leg IV of male *Tarsonemus gravis*, n. sp.

situated in front of medial end of apodeme III. Second hysterosomal 7 long, on caudal end of apodeme IV, the anterior end of apodeme IV uniting with posterior median apodeme caudal of mid-point; posterior median apodeme 26 long, ending anteriorly in an indistinct "V", the anterior ends of the "V" directed toward and almost reaching hysterosomals one.

Legs: Relatively short; tibiotarsus 19 long, 6 wide at base with a pair of rod-like sense organs, the dorsal member about half as long as and somewhat wider than the other, situated at proximal third, a long dorsal, barbulate seta situated dorsolateral to them, a clavate, annulated sense organ 6 long and about 1.5 wide situated slightly distal of middle of segment, ten other setae and a distal spine; genu I with four setae; femur I with three setae. Tarsus II with a proximal, clavate, annulated sense organ 4 long, 13 wide, and three setae; tibia II with four setae; genu II with three setae, two being barbulate and one of these being narrowly elliptic; femur II with three setae. Third segment of leg IV with a basal seta reaching nearly to base of preapical seta of this segment, preapical seta 12 long; fourth segment 8 long, about half as long as third, preapical seta coarse, 25 long, apical seta, thin 23 to 35 long.

Male:—Body black, usually with a whitish area in region of gential papilla, legs brownish. Capitulum 21 long not including palpi, 23 wide, base truncate; Palpus about 13 long, 4 wide, apparently 2-segmented, basal segment with a seta somewhat shorter than terminal segment, terminal segment with two spines on outer margin near distal end and two small sensillae on end. Genital papilla 25 long, 23 wide, apical quarter to third strongly constricted in form of a neck with end flared giving papilla a vase-like outline, base emarginate. Length of body including genital papilla 126 to 143, width 91.

Dorsal chaetotaxy: Propodosomals 27, 26, 73, and 34 long respectively, all scabrous in appearance; second about 5 from one and three and slightly lateral of a line drawn between them; fourth about 4 lateral of three. Hysterosomals coarse, barbulate, 40, 63, 58, and 65 long respectively; first situated on side of body about half way between hysterosomal suture and second which is over coxa III, third anteromedial of two and slightly anterior of secondary body suture, the fourth situated laterally over genital papilla near basal margin.

Ventral chaetotaxy and apodemes: First propodosomal about 3 long, situated about 5 behind apodeme I, distance to opposite member 8, a ring resembling a setal basal ring 7 lateral and slightly anterior of first propodosomal; second propodosomal about 5 behind apodeme II, distance to opposite member 21, a ring resembling a setal basal ring about 8 lateral and slightly posterior of second propodosomal. Apodeme II not reaching anterior median apodeme by about 2, medial end curved posteriorly, short; anterior median apodeme extending from apodemes I to transverse apodemes and indistinct in places; transverse apodemes faint, extending in practically a straight line nearly full width of body, but medial ends bent slightly forward just before uniting; area for a short distance anterior to transverse apodemes with numerous minute black dots. Hysterosomals both about 8 long; anterior end of apodeme III sometimes faint, forming an obtuse angle with its main part and extending

slightly caudomedially to its juncture with apodeme IV, anterior end of apodeme IV sometimes faint, forming an obtuse angle with its main part at juncture with medial end of apodeme III and extending nearly horizontally to its union with anterior end of posterior median apodeme.

Legs: Tarsus I 13 long, 4.5 wide, with an annulated, clavate sense organ 4 long, 1.5 wide and two ventral setae situated at about a third the length of segment from base, a stout preapical seta and three stout distal setae; caruncle and claw moderate in size; tibia I with five setae, one of the two dorsal ones scabrous in appearance and extending almost to end of tarsus, and a set of sense organs (one clavate, the other rod-like and about twice as long as clavate organ); genu I with four setae; femur I with three setae. Tarsus II with a clavate, annulated sense organ 6 long, 1.5 wide and three setae; tibia II with four setae and genu II with three setae, each segment with the proximal seta longer than the others, both of these setae scabrous in appearance; femur II with three setae. Coxa III marked with numerous black dots. Coxa IV similarly marked dorsad; femur IV 43 to 60 long with dorsal seta 29 to 42 long, proximal seta about 2 long (in one specimen on one side 7 long), distal seta 21 to 34 long, weakly scabrous in appearance; tibia IV with dorsal sense rod about 9 long, ventral seta 34 long, weakly scabrous in appearance; tarsus IV with one ventral and two dorsal setae, claw about 10 long.

Holotype: Female; U. S. Plant Introduction Garden, four miles south of South Miami, Florida, 1 December, 1955, (D. De Leon) from *Litchi chinensis*. *Allotype*: 7 June, 1956, other data same as for holotype. *Paratypes*: six females, 1 December, 1955, one male, 23 December, 1955, one female and four males, 7 June, 1956, all from U. S. Plant Introduction Garden.

This mite was found on the twigs and appears to be a fungus feeder, though further work may show that it feeds on sap, piercing the bark where it is thin.

Rhynchotarsonemus filifer, n. sp.

(Figure 5)

The female of *R. filifer* may be distinguished from *R. niger* Beer,[2] the only other member of the genus, by the sixth dorsal hysterosomal being about twice as long as the first, by the long dorsal seta of the tibiotarsus being situated about one third the length of the segment from the base, by the anterior median apodeme having a small V-shaped structure a short distance anterior to transverse apodemes, and by other characters; the male by the dorsal seta of femur IV being about as long as or longer than the body and by other characters. The male is so distinctive that some day the species will probably be placed in a new genus.

MALE:—Body oval, depressed. Propodosoma and legs brownish, hysterosoma black with a small white area anterior to genital papilla. Capitulum, including palpi, 33 long, 25 wide, base truncate; palpus 17 long, 2.8 wide. Genital papilla 21 long, 21 wide, anterior margin emarginate, sides anterior to constriction parallel. Length of body 126, width 74 to 115.

[2] Beer, R. E. 1954. A revision of the Tarsonemidae of the Western Hemisphere (Order, Acarina). Univ. Kansas Sci. Bul. Vol. 36, Pt II, No. 16: 1091-1387.

Dorsal chaetotaxy: Propodosomals 25, 17, 67, and 24 long respectively, fourth about 2 lateral of third; hysterosomals 29, 28, 29, and 15 long respectively, the first at side of body near hysterosomal suture; second about over coxa III, third just anterior to secondary body suture, distance to opposite member 30, fourth near end of body at edge of genital papilla.

Ventral chaetotaxy and apodemes: First propodosomal about 3 long, 4 behind apodeme I, distance to opposite member 5 to 11; a ring resembling a setal basal ring 6 lateral and slightly anterior of first propodosomal; second propodosomal 10 long, 5 behind apodeme II, distance to opposite member 24; a ring resembling a setal basal ring 8 lateral and slightly posterior of second propodosomal; anterior median apodeme extending from apodemes I to transverse apodemes, interrupted for a short distance at about one third and two thirds its length, medial end of apodeme II curved posteriorly, not uniting with anterior median apodeme; transverse apodemes faint, nearly meeting at mid-line. First hysterosomal 8 long, second 13 long; anterior (transverse) part of apodeme III faint, uniting with apodeme IV just posterior of anterior part of apodeme IV which is faint and extends to mid-line; posterior median apodeme distinct, anterior end uniting with apodeme IV.

Legs: Short; tarsus I about 11 long, 5 wide at base with a clavate, annulated sense organ 5 long, 1 wide situated near base of segment, a short, tapered seta anterior to it, a lateral and two ventral setae at about mid-length, a stout preapical seta and three stout distal setae; tibia I about 10 long, 7 wide with a set of three sense organs at about mid-length (the middle one small, enlarged apically, the second one clavate about 3.5 long, 0.7 wide, the third seta-like, longer than clavate organ) and four setae; genu I with a long, rather coarse, proximal seta and three other setae; femur I with three setae. Tarsus II with a short, rapidly tapering sense organ at base and four setae at about mid-length; tibia II with four setae at about mid-length, and near distal end of segment, a gradually tapering, annulated sense organ longer than tibia and tarsus combined; genu II with three setae. Leg IV relatively short; femur IV 41 to 51 long, 17 to 21 wide at base, dorsal seta 115 to 140 long, proximal seta 8 long, distal seta 20 long; tibia and tarsus fused, about 7 long, 7 wide, dorsal rod-like seta 7 long, ventral seta 32 long, one ventral and two dorsal setae shorter than the claw; claw 13 long.

Female:—Oval; legs and propodosoma brownish, hysterosoma shiny black with a narrow white area at caudal end. Propodosoma expanded, forming a hood over capitulum to base of palpi and laterally over coxae; spiracle on margin of hood a short distance behind first propodosomal. Capitulum, including palpi 42 long, 26 wide. Expanded apex of pseudostigmatic organ oval. Length of body 173, width 102.

Dorsal chaetotaxy: First propodosomal situated near anterolateral margin of hood, 16 long, distance to opposite member 22; second 31 long, situated near margin of hood about 17 behind first. Six pairs of hysterosomals; the first 15 long, second and third 8 long, fourth and fifth 10 long, sixth 30 long.

Ventral chaetotaxy and apodemes: First propodosomal 7 long, 1 behind apodeme I, distance to opposite member 5; second 10 long, on rear margin of apodeme II, distance to its opposite member 27. Apodeme II slightly

bowed posteriorly, medial end not reaching mid-line by about 7. Anterior median apodeme mostly indistinct, extending from apodemes I to transverse apodemes with thickenings at about 14 and 22 from its union with apodemes I, and a V-shaped structure about 6 from transverse apodemes, distinct caudal of "V". Transverse apodemes meeting at mid-line each curving anterolaterally to a point caudal of coxa II, direction of curve lessening slightly at about one third the length of apodeme from mid-line and increasing at about two thirds the length of apodeme from mid-line. First hysterosomal 9 long, situated slightly medial of expanded anterior end of apodeme III, distance to opposite member 21; second 7 long, on caudal end of apodeme IV which is indistinct except for a knot at about mid-length; posterior median apodeme 28 long, distinct except for the short V-shaped anterior end and for a short distance behind point of union with apodeme IV; caudal seta 10 long.

Legs: Leg I about 50 long. Tibiotarsus 17 long, 7 wide at base, with a set of three sense organs (two clavate, one seta-like), a seta about as long as segment and three other setae situated at basal third of segment, an annulated, clavate sense organ about 5.5 by 1.4 and two ventral setae at middle third, a stout preapical and three stout distal setae; genu I about 10 long, 10 wide, with four setae. Tarsus II with a short, rapidly tapering sense organ at base, an annulated, clavate sense organ 6 long, 1.4 wide immediately in front of it and four setae at apical half; tibia II with three setae; genu II with a coarse, spiculate, proximal seta and two distal setae. Segment III of leg IV, 11 long; segment IV, 8 long; preapical seta 31 long, apical seta about 50 long.

Holotype: Male; U. S. Plant Introduction Garden, four miles south of South Miami, Florida, 26 June, 1956, (D. De Leon) from *Litchi chinensis*. *Allotype*: on same slide as holotype. *Paratypes*: four males, nine females same collection data as for holotype.

Tarsonemus gravis, n. sp.

(Figure 6)

T. gravis runs to *T. cryptocephalus* (Ewing) in Beer's key (op. cit.), but it differs from this species by the third propodosomal being only slightly longer than the fourth, by femur IV being relatively short and broad, and by other characters.

Male:—Body oval, widest at about first hysterosomal seta, shiny, light brown. Capitulum truncate at base and widest near base, length including palpi 21, width 20 (in type specimen 18 long, 19 wide); palpi short, apparently 3-segmented, directed anteromedially. Genital papilla 21 long, 23 wide, cordate. Length of body including capitulum 125, width 67.

Dorsal chaetotaxy: Propodosomals 15, 8, 17 to 26, and 17 long respectively; second about 8 from first and 4 from third, fourth about 4 caudolateral of third. First hysterosomal at side of body about its length from hysterosomal suture; second 10 long situated over base of coxa III; third 9 long situated about four-fifths its length anterior of secondary body suture and about 10 medial of second; fourth 8 long at outer margin of genital papilla.

Ventral chaetotaxy and apodemes: First propodosomal about 6 long, situated against posterior margin of apodeme I, distance to opposite mem-

ber 6; second propodosomal about 7 long, 3 behind apodeme II, distance to opposite member 12. Anterior median apodeme distinct, stopping just short of inner ends of apodemes II, but in one specimen indistinctly uniting with them; inner ends of apodemes II not quite reaching mid-line. Transverse apodemes uniting at mid-line, together forming a smooth, shallow arc about 40 across. Anterior part of apodeme III usually indistinct, directed medially, uniting with apodeme IV behind or at its anterolateral angle; anterior part of apodeme IV usually indistinct, sometimes curving and meeting its opposite member at mid-line, at others obsolete beyond point of juncture with apodeme III; posterior median apodeme distinct, anterior end not uniting with anterior end of apodeme IV. First hysterosomal 8 long, against apodeme III at anterolateral curve; second hysterosomal 7 long.

Legs: Leg I from base of femur to end of claw 39 long; tarsus I 9 long, 5 wide at base, basal half with a proximal, clavate sense organ about 3.5 long, 1.5 wide and a short seta distal of it, distal half with a stout dorsal seta, two to three ventral setae, and with three stout setae and two spurs at apex of segment, caruncle and claw small; tibia I 7 long, 7 wide with a clavate sense organ about 2.5 long, 1.5 wide, a set of three sense organs shorter than the segment lateral to it, a long dorsal seta, and three shorter setae; genu I about 6 long, 8.4 wide with four setae; femur I about 10.5 long, 11 wide with four setae. Leg II 38 long; tarsus II tapering rapidly, 8.5 long, 5 wide at base with a proximal, annulated, clavate sense organ 5.6 long, 2.8 wide and four setae; tibia II 5.5 long, 7.2 wide with one dorsal and three ventral setae; genu II 5.5 long, 8.6 wide with three setae; femur II 10.5 long, 11 wide with two short dorsal setae and a long ventral seta. Leg IV from base of coxa to end of claw 34 long; femur IV 14 long (anterior margin), 11 wide at base, dorsal seta fine, about 10 long, proximal ventral seta coarse, about 7 long, distal ventral seta coarse, 14 long, tibia IV 4.2 long, 6.5 wide with a short dorsal sensilla and a ventral seta 58 long; tarsus IV about 3 long, 4 wide with a ventral and two dorsal setae; claw 6 long.

FEMALE:—Not known.

Holotype: Male; U. S. Plant Introduction Garden, four miles south of South Miami, Florida, 1 December, 1955 (D. De Leon) from *Litchi chinensis*. *Paratypes*: Two males, same collection data as for holotype. An additional male was collected from the fruit of *Ficus roxburghi*, South Miami, Flordia, 30 December, 1955.

The holotypes of the five species described above will be deposited in the U. S. National Museum, Washington, D. C., paratypes in the University of Florida Collections, Gainesville. Acknowledgment is made to Dr. E. W. Baker, U. S. Department of Agriculture for advice.

The following notes are on some described mites not previously reported from lychee:

TENUIPALPIDAE

Brevipalpus spp.

B. australis (Tucker), *B. lilium* Baker, and *B. phoenicis* (Geijskes) have been found feeding on the fruit. I have not found them on the leaves or twigs. These species, especially *phoenicis*, are common on other hosts

in this area sometimes causing appreciable injury; with the increased planting of lychee in recent years it is likely one or more of these species will become better adapted to this host and become a pest in the future.

TUCKERELLIDAE

Tuckerella ornata (Tucker)

T. ornata has been found feeding on the fruit, but is more commonly found on the twigs. Another species, *T. pavoniformis* (Ewing), earlier reported from lychee[3] has been collected from the twigs only. I have found neither species common on this host.

BDELLIDAE

Bdella distincta Baker and Balock

B. distincta is a large, red, predacious mite which occurs rather frequently on the twigs, but what it feeds on has not been determined.

[3] De Leon, D. 1955. Hosts of *Tuckerella pavoniformis* (Ewing) and *T. ornata* (Tucker) in Florida. Fla. Ent. 38: 80-90.

MINUTES OF THE 39TH ANNUAL MEETING OF THE FLORIDA ENTOMOLOGICAL SOCIETY

The 39th Annual Meeting of the Florida Entomological Society was held in the Floridan Hotel at Tallahassee, Florida, during August 30 and 31, 1956. The meeting opened at 9:30 A.M. August 30th.

Mr. Herman Mayeux gave the Presidential Address.

Twenty papers were given before the Society including two invitational papers. The Invitational Papers were "Forest Entomology in the South, its Past, Present and Future", by E. P. Merkle, and "Insect Problems and Practices on Shade Grown Tobacco in North Florida", by W. B. Tappan.

On Thursday August 30th, a most enjoyable hospitality hour was provided by industry, which was followed by an excellent banquet in the hotel.

The first business meeting was called to order by President Mayeux at 1:45 P.M. President Mayeux complimented the Program Committee and the Local Arrangements Committee on the excellent job they had done arranging for the 39th Annual Meeting.

The President asked for a report on the Membership Committee. H. A. Denmark reported that at present the Society had only 116 paid up members and suggested more active membership drives should be made. Denmark reported that with loss of so many members the financial condition of the Society was serious. Dr. Jim Griffiths asked for suggestions on getting more money. President Mayeux suggested advertising rates should be adjusted upward and that raising dues should be considered. He suggested the new President could name a committee to study raising of dues. H. V. Weems spoke in favor of raising dues of the Society to $5.00. President Mayeux mentioned $4.00 dues can be charged legally; however, higher dues would conflict with existing postal laws. Dr. Griffiths made a motion that the new President appoint a committee to examine the financial situation and make recommendations to alleviate the situa-

(Continued on Page 176)

THE MEDITERRANEAN FRUIT FLY INFESTS FLORIDA AGAIN: SECOND REPORT[1]

On May 16, 1956, fruit picking and ground spraying were discontinued except for isolated infestations. Aerial spraying commenced at Goulds, Florida, on May 18. A Piper Cub was used in this operation, and this plane was kept busy spraying newly-found infested areas. On June 12, five contracts were let for the spraying of 80,000 acres by single-engine aircraft. By June 30 a total of 143,855 acres had been treated with single-engine aircraft. The use of multi-engine aircraft was started June 15, to spray 210,000 acres from West Palm Beach south to Kendall in Dade county. The first spraying was completed June 25 and a second application was being applied at the end of the month. The third application was completed July 17, the fourth July 27, the fifth August 6, the sixth on August 17. Sauce Base No. 7 is the attractant now used with malathion. The use of granular dieldrin as a surface application was begun during June. This insecticide is being applied by plane and handseeders. A distance of 5 feet beyond the drip of the host plant is treated by handseeders. Aerial application is based on the rate of 50 pounds of 10 percent dieldrin per acre.

On May 21, all personnel with the exception of a secretary at 2204 Salzedo Street, Coral Gables, and one man at 2690 N. W. 7th Avenue, Miami, were moved to Masters Field Air Base, Opa Locka and the main office was moved to Lake Alfred August 31. Mr. G. G. Rohwer took charge of all Federal operations. Mr. Wilbur Charles is the State Director of the Mediterranean fruit fly campaign. Mr. D. Whittam, USDA, and Mr. T. E. Whitmore, State Plant Board, worked jointly on plane spraying. Messrs. Dunn and Faircloth, USDA, and Mr. L. W. Holley, State Plant Board, worked together on ground equipment. Mr. C. E. Shepard was in charge of clean-up and spraying for certification of nursery inspectors. Messrs. H. Hensley, C. H. Gaddis, F. D. Bittner, USDA, and Mr. G. B. Ellis, State Plant Board, were in charge of fumigation and quarantine. Messrs. E. G. Donahue and G. C. Tanton, State Plant Board, are in charge of road blocks.

By May 14, larvae of the Medfly were found in Palm Beach county, and on May 23 larvae were found in Hendry county. May 25, larvae were found in Sarasota and Collier counties. May 28, larvae were found in Highlands and Lee counties. May 29, larvae were found in Polk and Hardee counties. June 2, adults were found in DeSoto and Charlotte counties. June 4, larvae were found in Manatee county. June 6, one adult was discovered in Brevard county. June 11, adults were reported in Indian River and Martin counties. June 13, larvae were found in Pinellas county. June 18, adults were found in Hllsborough county. June 30, larvae were found in Monroe county. July 3, larvae were found in Okeechobee county. July 6, adults were found in Lake county. July 11 an adult was found in St. Lucie county. July 18, an adult was found in Pasco county. July 23, an adult was found in Orange

[1] An earlier report, "The Mediterranean Fruit Fly Infests Florida Again: Early Chronology," was published in the Fla. Ent. 39(2): 85-87.

county. July 24, an adult was found in Glades county. August 10, adults were found in Seminole county. August 24 adults were collected in Osceola county. There were 1384 infested properties reported from the above 27 counties on August 24.

The cooperative eradication program is being financed on a 50-50 basis between the state and federal governments with the funds being administered separately. A special session of the Florida Legislature appropriated $5,00,000 in July 1956. Approximately $1,250,000 worth of insecticides have been purchased through August 15, 1956.

Fumigation stations or chambers have been set up or are in the process of being established to serve all the quarantined areas. These are operated by private concerns under the authority of State and Federal personnel.

Road blocks have been discontinued on the East Coast and the central part of the state. However, there are still ten road blocks surrounding the Tampa and the St. Petersburg areas on September 15.

Harold A. Denmark
State Plant Board
Gainesville, Florida

(Continued from Page 174)

tion; also, to consider sustaining memberships. The motion was carried. R. A. Morse moved that it be recommended to the new President he call a special meeting to consider the Society's financial condition and the possibility of raising dues. Motion was carried.

President Mayeux asked for the Auditing Committee Report, which is given below:

Florida Entomological Society Report of Auditing Committee as of August 15, 1956.

The Auditing Committee is composed this year of Dr. Simanton, Dr. Weems and W. B. Greshman, Jr. The period covered is from 8/15/55 - 8/15/56.

The Committee wishes to report as follows:

1. It has checked the amounts received from members for dues. All members are paid for 1956. Those who have not paid dues in the last two years we understand have been dropped after three notifications — 116 members paid 1956 dues.
2. Three full members and 1 student member have paid in advance for 1957. This total is $10.50.
3. We have checked receipts and disbursements in the journal against the check book and bank statements, and find all in good order and balancing.
4. The Committee notes that the bank balance has decreased from $910.00 on August 15, 1955 to $467.54 on August 15, 1956, a drop of $442.46. At this rate, the Society will be in financial distress at this time next year, unless action is taken to lower expenses by not carrying delinquent members (who continue to receive the Bulletin), and/or by increasing income.

The Committee wishes to compliment the Treasurer on a difficult job well and faithfully done.

This constitutes the report of the Auditing Committee.

Respectfully submitted,
Howard V. Weems, Jr.
W. A. Simanton
W. B. Gresham, Jr.

The Auditing Committee Report was accepted by a vote of the membership.

Meeting adjourned at approximately 2:30 P.M.

The Second and final business meeting of the Society was called to order by President Mayeux at 12:30 P.M. August 31st.

President Mayeux asked for a report on the committee studying possibility of the Society joining the Florida Agricultural Council. Dr. Griffiths gave the report with the following recommendation:

"It is believed that membership in the Florida Agricultural Council should not be undertaken unless the Society is completely sold on the idea. This may be interpreted to mean that membership should be undertaken only after at least a two-thirds majority of the members voting are in agreement and if a majority of those individuals employed by State Agencies do not feel that it is desirable, they should have a veto power.

"It would be the recommendation of this Committee that a straw vote should be cast upon which members would state whether or not they are employed by State Agencies and whether or not they are in favor of joining the Agricultural Council. If the vote by employees of State Agencies does not carry a majority in favor of joining, no further consideration should be given a measure at this time. If a majority is in favor then the entire matter should be submitted by mail to the membership and carried only if a majority of the membership votes and if two-thirds of the voting group are in favor."

The vote of the State Employees was against joining the Florida Agricultural Council.

President Mayeux asked for a committee report on the possibility of the Sub-Tropical Entomologists becoming a branch of the Society. The following motion by Dr. Wilson was given in its entirety:

"Proposed Motion for Establishment of Sub-Tropical Entomologists of Florida as the Sub-Tropical Branch of The Florida Entomological Society.

"I would like to make the motion that the Society approve the recent petition of the Sub-Tropical Entomologists of Florida that this new Society become a Branch of the Florida Entomological Society. It is further moved that the Sub-Tropical Entomologists of Florida becomes a Branch of our Society immediately upon acceptance of the following provisions:

1. That the name of the Branch will be The Sub-Tropical Branch of the Florida Entomological Society.
2. That the area of the Branch consist of the following counties of the State of Florida: Broward, Collier, Dade and Monroe.
3. That membership in the Branch shall be restricted to members of the Florida Entomological Society residing in the area covered by the Branch.
4. That officers of the Branch shall be a Chairman, a Vice-Chairman, and a Secretary-Treasurer.
5. That the Branch shall hold meetings or conferences at appropriate times and places and shall elect officers once each year.

6. That the Branch shall not charge dues, but may charge registration fees for those in attendance at meetings in an amount to be determined by the Branch.

It is further moved that this motion be voted on in its two parts; second that the Branch be established and first, the provisions of establishment."

A motion was also made by Dr. Wilson and unanimously carried by the membership that a committee be appointed to make necessary revisions in the Constitution and By-Laws for establishing the Branch and to be presented at the next meeting of the Society.

Dr. Butcher made the motion that Palm Beach County be added in the area covered by the Branch. Unanimously carried.

President Mayeux asked for a Publicity Committee Report by Chairman Charlie Brain. The President made a proposal that the Publicity Committee be made a permanent committee and that the committee be on equal basis with arrangements and program committees. The proposal was passed by unanimous vote.

President Mayeux asked for a report on the Exhibit Committee. Dr. Murphey exhibited a proposed picture panel to be used in the project.

Henry True made the motion that the incoming Executive Committee be authorized to construct the exhibit on the subject "Entomology in Action" and to have it ready for display at the next annual meeting, and that the residue from the Entertainment Fund be used toward defraying the cost. The motion was carried unanimously.

President Mayeux called for the "Entomology in Action" Committee Report. Louis M. Wright showed slides and gave the sample talk that is to be used. The membership voted in favor of continuing in making use of the slides and talk.

President Mayeux called for the Board of Managers Report.

Dr. Lewis Berner made a motion that for future meetings authors of papers to be given at the meeting be required to send in an abstract of approximately 100 words that can be published in the following issue of The Entomologist. Motion was carried by unanimous vote.

President Mayeux called for old or new business and suggested that the membership contact members of the Executive Committee on any ideas they have for having sustaining members to the Society.

Dr. Rhodes moved that the incoming President get a list of duties of various committees as a guide to be sent to future committee members. Unanimously passed.

The President called for a report of the Nominating Committee, which follows:

President	M. Murphey
Vice-President	I. H. Gilbert
Editor	Lewis Berner
Assistant Editor	Norman Hayslip
Executive Committee	W. B. Gresham, Jr.
Secretary	R. O. Kirkland

Respectfully submitted,
Charles R. Stearns, Jr., Chairman

The slate of officers was elected by unanimous vote.

The President called for a report of the Resolutions Committee, which follows:

RESOLUTIONS

"Whereas extremely toxic insecticides are being applied by inexperienced operators to lawns in residential areas of the State; and this type of operation could lead to serious consequences, be it resolved:

1. That the Florida Entomological Society hereby recommend that the incoming President appoint a committee for the purpose of study-

ing the problem and drafting remedial measures for its solution. Furthermore, that this committee be composed of one member each from the State Board of Health, the Structural Pest Control Association and the Agricultural Experiment Station.

"Be it further resolved:

2. That the Society endorse the Presidential Address to the effect that entomological education be advanced in all ways possible.

3. That a vote of thanks be extended to the officers, individuals and committees of our Society, to the Management and Employees of the Floridan Hotel and to the Tallahassee Chamber of Commerce which contributed to the success of the 39th Annual Meeting.

4. That in appreciation for the splendid and patient editing done by Dr. Lewis Berner an especial expression of thanks be made. We recommend that a letter be sent from the Society to the Department and to the Dean, College of Arts and Sciences, University of Florida, expressing our appreciation.

5. That appreciation be expressed to the local arrangements committee, W. C. Rhodes, W. B. Tappan, R. R. Reed and A. N. Phillips.

6. That a vote of thanks be extended to Industry for a most enjoyable social hour.

7. In appreciation of the splendid field trip to North Florida Station, that an early meeting of the Society be held again in Tallahassee with the understanding that a beef barbecue or steak fry be given by the North Florida Station.

R. E. Waites
G. H. Beames
D. O. Wolfenbarger, Chairman"

The Resolutions Committee Report was accepted by unanimous vote.

President Murphey was escorted to the speakers stand where he thanked the Society for the honor bestowed upon him.

The meeting adjourned at approximately 2:30 P.M.

Respectfully submitted,
R. O. Kirkland
Secretary

Report of Treasurer-Business Manager for The Year Ending August 15, 1956

RECEIPTS

From Membership Dues*	$ 653.25
From Subscriptions	136.00
From Reprints	93.79
From Back Numbers	74.08
From Advertisers, Florida Entomologist	620.00
From Transfer of Savings Account to Checking	27.50
	$1,604.62
Balance on Hand 8/15/55	910.00
	$2,514.62

DISBURSEMENTS

R. B. Thomas (1955 Banquet entertainment)	$ 25.00
Gainesville Letter Shop (tickets)	11.59
Parker Office Machine Company	5.15
Pepper Printing Company	1,788.12
Florida Film Service	15.00
G. W. Dekle (misc. meeting exp.)	3.97
Jax Coach (charter bus 1955 meeting)	56.00
Lewis Wright, Jr. (misc. exp. meeting)	10.60
R. H. Nelson (brochures)	60.00
Jax Tourist Convention	8.26
Lewis Berner (misc. exp.)	5.00
Postage	5.00
Mrs. H. A. Denmark (secretarial help)	10.00
National Library Bindery	9.95
Maxwell (postage for announcements)	25.00
Postage for request titles	7.65
Bank Service Charge	.79
	$2,047.08
Balance on hand 8/15/56	467.54
	$2,514.62

Respectfully submitted,
H. A. Denmark
Treasurer

* This includes $10.50 for 1957 dues.

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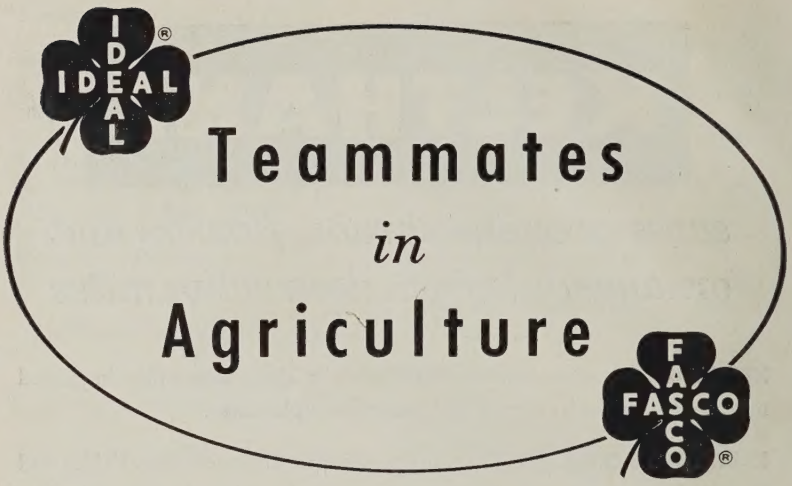

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